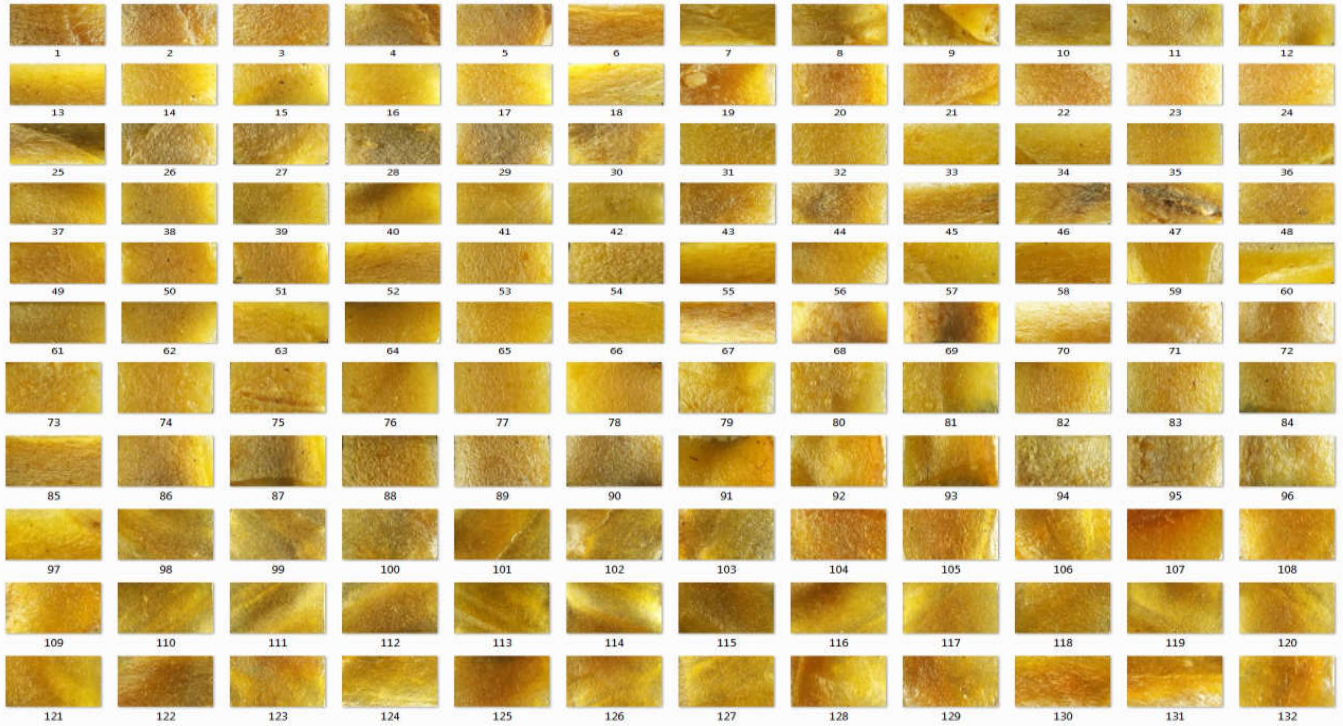
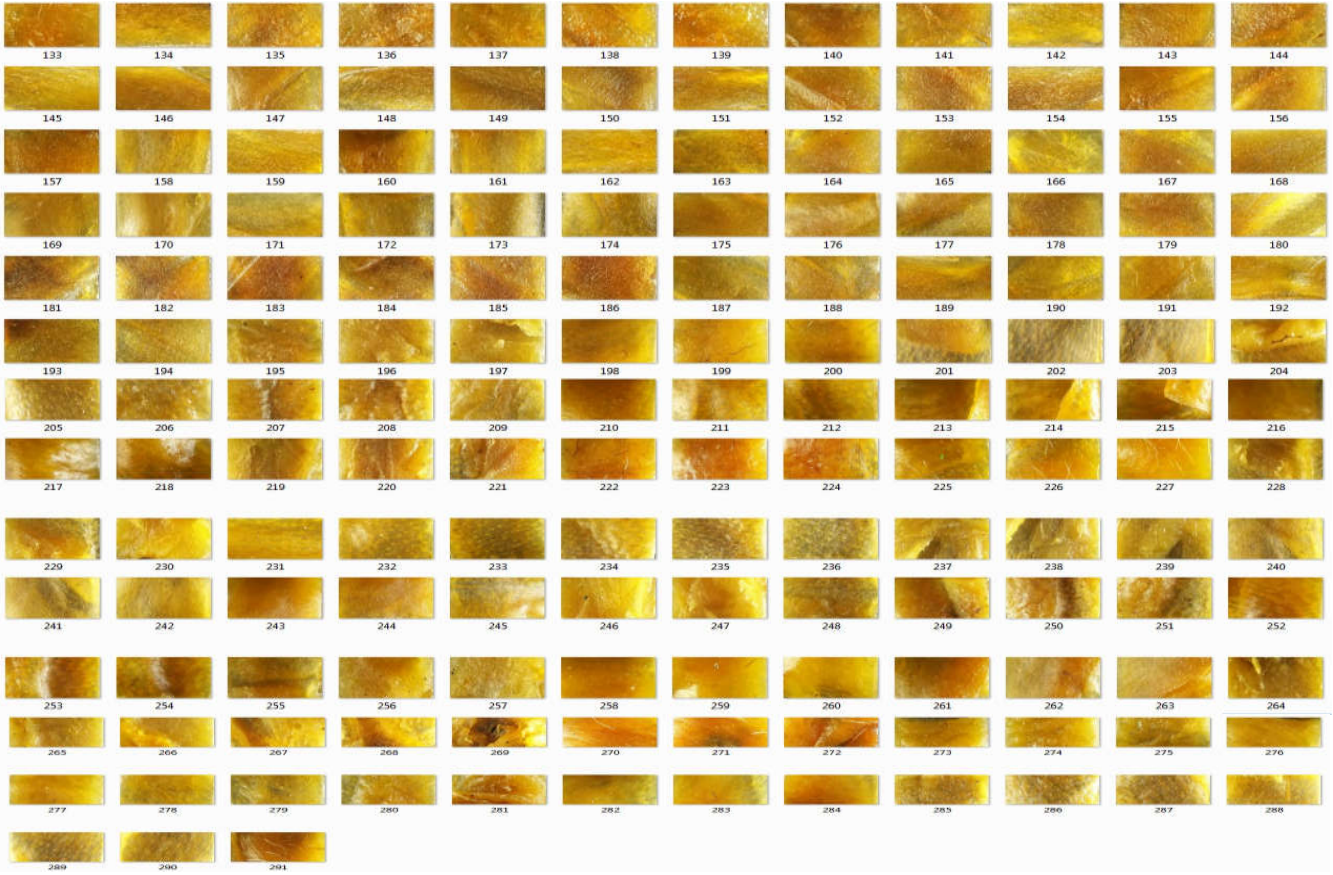
Lampiran 1. Citra Hasil Cropping Data Training dan Validasi

1. Citra Training




133 134 135 136 137 138 139 140 141 142 143 144
145 146 147 148 149 150 151 152 153 154 155 156
157 158 159 160 161 162 163 164 165 166 167 168
169 170 171 172 173 174 175 176 177 178 179 180
181 182 183 184 185 186 187 188 189 190 191 192
193 194 195 196 197 198 199 200 201 202 203 204
205 206 207 208 209 210 211 212 213 214 215 216
217 218 219 220 221 222 223 224 225 226 227 228
229 230 231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250 251 252
253 254 255 256 257 258 259 260 261 262 263 264
265 266 267 268 269 270 271 272 273 274 275 276
277 278 279 280 281 282 283 284 285 286 287 288
289 290 291

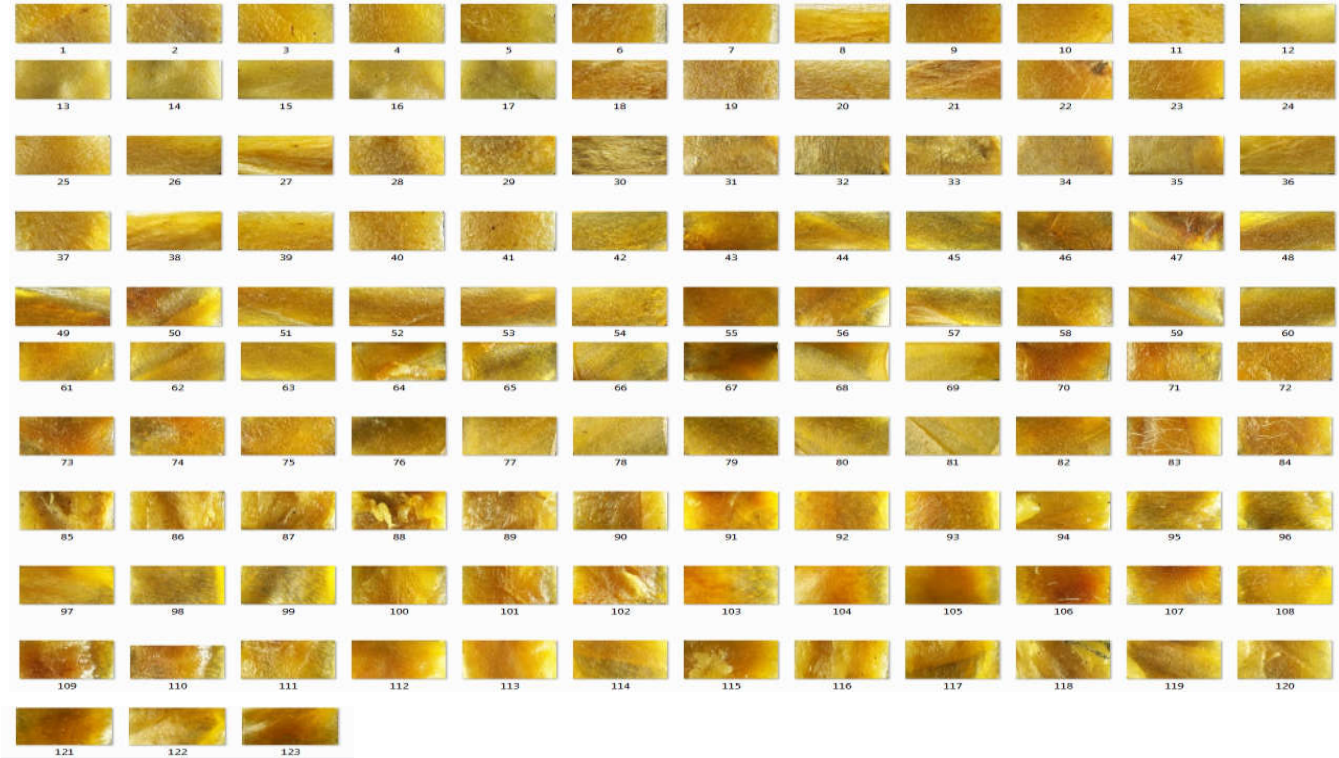
Keterangan:

No. 1 - 97= Krecek Sapi

No. 98 – 194 = Krecek Kerbau

No. 195 – 291 = Krecek Babi

2. Citra Validasi



Keterangan:

No. 1 - 41= Krecek Sapi

No. 41 – 82 = Krecek Kerbau

No. 83 – 123 = Krecek Ba

Lampiran 2 *Source Code* Ekstraksi Ciri Citra Ciri Warna RGB dan HSI

```
clc;clear;close all;

image_folder='Citra Validasi';
filenames=dir(fullfile(image_folder,'*.bmp'));
total_images=numel(filenames);

for n =1:total_images

full_name=fullfile(image_folder,filenames(n).name);
%membaca file gambar
    A=imread(full_name);
%mengitung jumlah pixel
    s=size(A);
    jumlahpx=s(1)*s(2);
%konversi tipe data citra ke double
    C=double(A);
%membaca nilai R,G,B
    R=C(:,:,1);
    G=C(:,:,2);
    B=C(:,:,3);
%menjumlahkan nilai R,G,B
    sumR=sum(sum(R));
    sumG=sum(sum(G));
    sumB=sum(sum(B));
%menghitung rata-rata nilai R,G,B
    mean_R (n) = sumR/jumlahpx;
    mean_G (n) = sumG/jumlahpx;
    mean_B (n) = sumB/jumlahpx;
%normalisasi nilai RGB [0,1]
    r=C(:,:,1)/255;
    g=C(:,:,2)/255;
    b=C(:,:,3)/255;
   %menghitung nilai Hue yang menyatakan warna
   dominan pada citra
    N=0.5*((r-g)+(r-b));
    D=(sqrt((r-g).^2+(r-b).*(g-b)));
    theta=acosd(N./(D+eps));
    H=theta;
```

```
%menghitung nilai saturation yang menyatakan sifat
purity citra
    N1=min(min(r,g),b);
    D1=(r+g+b);
    D1(D1==0)=eps;
    S=1-3.*N1./D1;
    H(S==0)=0;
%menghitung nilai intensity
    I=1/3.*(r+g+b);
%menjumlahkan nilai H,S,I
    sumH=sum(sum(H));
    sumS=sum(sum(S));
    sumI=sum(sum(I));
%menghitung rata-rata niai H,S,I
    mean_H (n)=sumH/jumlahpx;
    mean_S (n)=sumS/jumlahpx;
    mean_I (n)=sumI/jumlahpx;

end
```

Lampiran 3 *Source Code* Ekstrasi Ciri Tekstur

```
clc;clear;close all;

image_folder='Citra Validasi';
filenames=dir(fullfile(image_folder,'*.bmp'));
total_images=numel(filenames);

for n=1:total_images

full_name=fullfile(image_folder,filenames(n).name);
    A=imread(full_name);
if length(size(A))==3
    B=rgb2gray(A);
end
   GLCM_V=graycomatrix(B,'offset',[0
          1],'NumLevels',32,'Symmetric',false);
    stats(n)=graycoprops(GLCM_V,{'contrast','correla
          tion','energy','homogeneity'});
   entrop(n)=entropy(GLCM_V);
   contrast(n)=stats.Contrast;
   energy(n)=stats.Energy;
   homog (n)=stats.Homogeneity;
   correl (n)=stats.Correlation;

   con=[stats.Contrast];
   cor=[stats.Correlation];
   ene=[stats.Energy];
   hom=[stats.Homogeneity];
end
```

Lampiran 4*Source Code* JST

```
%Normalisasi Data Input
[pn,minp,maxp,tn,mint,maxt] = premnmx(p,t);
[qn,minq,maxq,sn,mins,maxs] = premnmx(q,s);
%Pembuatan JST
Net=
newff(minmax(pn),[201],{'logsig','logsig'},'trainb')
;
net.trainParam.Epochs = 5000;
net.trainParam.goal =0.01;
net.trainParam.lr = 0.1;
net.trainParam.show = 200;
net.trainParam.mc = 0.9;
%Proses Training JST
[net,train]=train(net,pn,t);
%Evaluasi Hasil Training
w=sim(net,pn);
wt=postmnmx(w,mint,maxt);
[m,b,r]=postreg(wt,t);
mse_T=mse(w-t)
y=round(sim(net,pn));
yt= postmnmx(y,mint,maxt);
[c,d]=find(y==t);
akurasi_T=sum(c)/291*100
%Evaluasi Hasil Validasi
x=sim(net,qn);
xt=postmnmx(x,mins,maxs);
L= [(1:size(qn,2))' s' xt' (s'-xt')];
figure,[m1,b1,r1]=postreg(xt,s);
mse_V=mse(x-s)
z=round(sim(net,qn));
zt=postmnmx(z,mins,maxs);
K=[(1:size(qn,2))' s' zt' (s'-zt')];
[e,f]=find(z==s);
akurasi_V=sum(e)/123*100
```

```
%Bobot dan Bias Optimal
net.IW{1,1};

net.b{1};

net.LW{2,1};

net.b{2};

BobotAkhir_Input_before=net.IW{1,1};

BobotAkhir_Bias_Input_before=net.b{1};

BobotAkhir_Layer_before=net.LW{2,1};

BobotAkhir_Bias_Layer_before=net.b{2};
```

Lampiran 5 Bobot dan Bias Optimal Klasifikasi Jenis Krecek Rambak

1. Bobot dan Bias dari Input Layer ke Hidden Layer

Node Hidden Layer	Input						
	R	G	B	H	S	I	Bias
1	2.5418	1.2600	-0.4859	2.0307	-1.2080	-2.7239	-4.6017
2	2.3217	-2.6604	-0.6843	-1.4081	1.8969	1.6797	-4.1157
3	-2.8119	2.6388	2.0148	0.0541	0.6303	-1.4160	3.6390
4	2.7159	2.8453	1.9227	1.2996	0.3617	0.1698	-3.2054
5	0.8019	1.0745	-1.8927	2.3465	2.5191	-2.0161	-2.6609
6	-2.6375	1.6791	-0.0828	2.9968	-1.3925	0.6592	2.2079
7	-2.1017	2.3355	-0.4597	0.4760	2.3652	-2.2211	1.7802
8	0.4322	-0.9802	1.3491	-3.3030	2.3137	1.4172	-1.2139
9	3.1422	1.0811	1.4636	-2.3895	-0.8555	1.3132	-0.7019
10	2.9872	-2.1372	1.5975	-1.5854	0.4887	1.5725	-0.2863
11	-2.2078	1.3449	-1.4331	2.2133	-2.7624	-0.3074	-0.2256
12	2.2639	-2.3060	0.8153	-1.2261	-2.0956	-2.0569	0.6614
13	3.1349	-1.4950	1.1035	2.1757	0.1569	-1.8213	1.2527
14	-0.0844	-2.6212	-1.9452	-1.4739	1.6112	2.3991	-1.7141
15	1.4733	-1.9493	-1.8194	2.1145	2.0600	-1.6741	2.2595
16	-2.3169	2.1509	0.0552	-0.9565	-2.5054	2.1742	-2.5590
17	-0.6359	1.4759	3.5171	-2.3707	0.5885	0.2572	-3.2223
18	2.6077	-1.1478	-1.0020	-1.5621	-0.1909	3.1118	3.6407
19	1.5830	2.4391	0.4619	0.6286	-2.6444	-2.2855	4.1277
20	2.9022	-2.9321	-1.7348	-0.1650	-1.0365	-0.3559	4.6244

2. Bobot dan Bias dari Hidden Layer ke Output Layer

Node Hidden Layer 1	Output	
	Y	Bias
1	-1.5211	1.1016
2	1.786	
3	-2.1716	
4	0.9262	
5	1.2144	
6	1.1139	
7	-1.6518	
8	-0.3615	
9	-1.127	
10	1.0122	
11	-0.5271	
12	1.3863	
13	-1.4597	
14	-0.8623	
15	-1.3963	
16	-1.5813	
17	1.3509	
18	0.0508	
19	-0.0774	
20	-1.6317	

Lampiran 6 Hasil Denormalisai Nilai Output

Jenis Krecek	Nilai Aktual	Nilai Prediksi	Selisih
Sapi	1	0.8691	0.1309
Sapi	1	0.8661	0.1339
Sapi	1	0.8602	0.1398
Sapi	1	0.8709	0.1291
Sapi	1	0.4834	0.5166
Sapi	1	0.0493	0.9507
Sapi	1	0.9073	0.0927
Sapi	1	0.7442	0.2558
Sapi	1	0.7270	0.2730
Sapi	1	0.8746	0.1254
Sapi	1	0.8818	0.1182
Sapi	1	0.7938	0.2062
Sapi	1	0.1543	0.8457
Sapi	1	0.4965	0.5035
Sapi	1	0.8842	0.1158
Sapi	1	0.8837	0.1163
Sapi	1	0.9127	0.0873
Sapi	1	0.8716	0.1284
Sapi	1	0.8317	0.1683
Sapi	1	0.8878	0.1122
Sapi	1	0.2492	0.7508
Sapi	1	0.8328	0.1672
Sapi	1	0.8430	0.1570
Sapi	1	0.8759	0.1241
Sapi	1	0.8948	0.1052
Sapi	1	0.7061	0.2939
Sapi	1	0.8813	0.1187
Sapi	1	0.6821	0.3179
Sapi	1	0.1890	0.8110

Jenis Krecek	Nilai Aktual	Nilai Prediksi	Selisih
Sapi	1	0.1712	0.8288
Sapi	1	0.8118	0.1882
Sapi	1	0.8657	0.1343
Sapi	1	0.8057	0.1943
Sapi	1	0.8194	0.1806
Sapi	1	0.9039	0.0961
Sapi	1	0.8303	0.1697
Sapi	1	-0.1162	1.1162
Sapi	1	0.8346	0.1654
Sapi	1	0.8511	0.1489
Sapi	1	0.8589	0.1411
Sapi	1	0.8755	0.1245
Kerbau	0	0.2336	-0.2336
Kerbau	0	0.0996	-0.0996
Kerbau	0	-0.8025	-0.1975
Kerbau	0	-0.8070	-0.1930
Kerbau	0	-0.9371	-0.0630
Kerbau	0	0.2211	-0.2211
Kerbau	0	0.1934	-0.1934
Kerbau	0	0.2641	-0.2641
Kerbau	0	0.1587	-0.1587
Kerbau	0	-0.7502	-0.2498
Kerbau	0	0.2111	-0.2111
Kerbau	0	-0.9422	-0.0578
Kerbau	0	0.1014	-0.1014
Kerbau	0	0.1815	-0.1815
Kerbau	0	0.2554	-0.2554
Kerbau	0	0.2242	-0.2242

Jenis Krecek	Nilai Aktual	Nilai Prediksi	Selisih
Kerbau	0	-0.5555	-0.4445
Kerbau	0	-0.7502	-0.2498
Kerbau	0	-0.9227	-0.0773
Kerbau	0	0.1471	-0.1471
Kerbau	0	0.0924	-0.0924
Kerbau	0	0.1690	-0.1690
Kerbau	0	0.1078	-0.1078
Kerbau	0	0.0668	-0.0668
Kerbau	0	0.1540	-0.1540
Kerbau	0	-0.5825	-0.4175
Kerbau	0	0.1466	-0.1466
Kerbau	0	0.1217	-0.1217
Kerbau	0	0.1618	-0.1618
Kerbau	0	0.1305	-0.1305
Kerbau	0	-0.8856	-0.1144
Kerbau	0	-0.7434	-0.2566
Kerbau	0	-0.7913	-0.2087
Kerbau	0	0.0744	-0.0744
Kerbau	0	0.1696	-0.1696
Kerbau	0	0.2117	-0.2117
Kerbau	0	-0.7502	-0.2498
Kerbau	0	0.1801	-0.1801
Kerbau	0	0.1295	-0.1295
Kerbau	0	-0.7434	-0.2566
Kerbau	0	0.1731	-0.1731
Babi	-1	-1.0021	0.0021
Babi	-1	-1.0022	0.0022
Babi	-1	-0.0229	0.0229

Jenis Krecek	Nilai Aktual	Nilai Prediksi	Selisih
Babi	-1	-0.1287	0.1287
Babi	-1	0.0249	-0.0249
Babi	-1	-0.0219	0.0219
Babi	-1	0.0210	-0.0210
Babi	-1	-0.4363	0.4363
Babi	-1	-0.2183	0.2183
Babi	-1	-1.0026	0.0026
Babi	-1	-1.0021	0.0021
Babi	-1	-1.0022	0.0022
Babi	-1	-0.1847	0.1847
Babi	-1	-1.0022	0.0022
Babi	-1	-1.0022	0.0022
Babi	-1	-0.1715	0.1715
Babi	-1	-0.1240	0.1240
Babi	-1	-0.2272	0.2272
Babi	-1	-1.0024	0.0024
Babi	-1	-1.0020	0.0020
Babi	-1	-1.0021	0.0021
Babi	-1	-0.2066	0.2066
Babi	-1	-1.0024	0.0024
Babi	-1	-1.0021	0.0021
Babi	-1	-1.0022	0.0022
Babi	-1	-0.3385	0.3385
Babi	-1	-0.3836	0.3836
Babi	-1	-0.2991	0.2991
Babi	-1	-1.0022	0.0022

Jenis Krecek	Nilai Aktual	Nilai Prediksi	Selisih
Babi	-1	-1.0021	0.0021
Babi	-1	-0.2272	0.2272
Babi	-1	-1.0021	0.0021
Babi	-1	-1.0023	0.0023
Babi	-1	-0.2390	0.2390
Babi	-1	-1.0022	0.0022
Babi	-1	-1.0021	0.0021
Babi	-1	-1.0021	0.0021
Babi	-1	-1.0020	0.0020
Babi	-1	-1.0022	0.0022
Babi	-1	-0.0114	0.0113
Babi	-1	-0.3279	0.3279

Lampiran 7 Hasil Klasifikasi Jenis Krecek Rambak

Jenis Krecek	Kelas Aktual	Kelas Prediksi	Keterangan
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	0	FALSE
Sapi	1	0	FALSE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	0	FALSE
Sapi	1	0	FALSE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	0	FALSE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE

Jenis Krecek	Kelas Aktual	Kelas Prediksi	Keterangan
Sapi	1	0	FALSE
Sapi	1	0	FALSE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	0	FALSE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Sapi	1	1	TRUE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	-1	FALSE
Kerbau	0	-1	FALSE
Kerbau	0	-1	FALSE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	-1	FALSE
Kerbau	0	0	TRUE
Kerbau	0	-1	FALSE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE

Jenis Krecek	Kelas Aktual	Kelas Prediksi	Keterangan
Kerbau	0	0	TRUE
Kerbau	0	-1	FALSE
Kerbau	0	-1	FALSE
Kerbau	0	-1	FALSE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	-1	FALSE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	-1	FALSE
Kerbau	0	-1	FALSE
Kerbau	0	-1	FALSE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	-1	FALSE
Kerbau	0	0	TRUE
Kerbau	0	0	TRUE
Kerbau	0	-1	FALSE
Kerbau	0	0	TRUE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE

Jenis Krecek	Kelas Aktual	Kelas Prediksi	Keterangan
Babi	-1	0	FALSE
Babi	-1	0	FALSE
Babi	-1	0	FALSE
Babi	-1	0	FALSE
Babi	-1	0	FALSE
Babi	-1	0	FALSE
Babi	-1	0	FALSE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	0	FALSE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	0	FALSE
Babi	-1	0	FALSE
Babi	-1	0	FALSE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	0	FALSE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	0	FALSE
Babi	-1	0	FALSE
Babi	-1	0	FALSE
Babi	-1	-1	TRUE

Jenis Krecek	Kelas Aktual	Kelas Prediksi	Keterangan
Babi	-1	-1	TRUE
Babi	-1	0	FALSE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	0	FALSE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	-1	TRUE
Babi	-1	0	FALSE
Babi	-1	0	FALSE